KARATERISTIK MORFOMETRIK DAN MERISTIK *LEMON SWEETLIPS Plectorhinchus flavomaculatus* (Cuvier, 1830) YANG DIDARATKAN DI TEMPAT PELELANGAN IKAN POETERE MAKASSAR

MORPHOMETRIC AND MERISTIC CHARACTERISTICS OF THE LEMON SWEETLIPS, Plectorhinchus flavomaculatus (Cuvier, 1830) AT FISH LANDING SITE POETERE MAKASSAR

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ABSTRAK

Secara global, belum banyak penelitian terkait ikan kaneke *Plectorhinchus flavomaculatus* famili Haemulidae, termasuk di Sulawesi Selatan. Penelitian ini bertujuan untuk menganalisis perbedaan karakter morfometrik dan meristik ikan kaneke untuk menemukan marka atau karakter penciri yang dapat digunakan untuk mendiskriminasi ikan jantan dan betina. Penelitian dilakukan pada bulan Oktober-Desember 2022. Sampel *P. flavomaculatus* yang dianalisis berjumlah 60 individu terdiri dari 30 jantan dan 30 betina. Sebanyak 16 karakter morfometrik dan sembilan karakter meristik dianalisis menggunakan analisis diskriminan metode *stepwise* dan uji-t. Hasil penelitian menunjukkan bahwa rerata panjang baku ikan jantan 265,03 ± 27,56 mm dengan satu individu *outlier* dan lebih bervariasi dibandingkan dengan panjang baku ikan betina (265,27 ± 19,71 mm). Tiga karakter dari 16 karakter morfometrik yang dianalisis signifikan mendiskriminasi ikan jantan dan ikan betina, yaitu panjang kepala, panjang jari-jari lemah ke-2 sirip anal dan tinggi pipi. Fungsi diskriminan yang terbentuk mendiskriminasi 30 individu yang diduga jantan menjadi 22 jantan dan 8 betina serta mendiskriminasi 30 individu yang diduga betina menjadi hanya 20 betina dan 10 jantan. Jumlah jari-jari keras sirip anal dan jumlah jari-jari sirip perut kiri *P. flavomaculatus* jantan lebih banyak dibandingkan dengan jumlah jari-jari keras sirip anal dan jumlah jari-jari sirip perut kiri ikan betina. Hasil penelitian dapat digunakan untuk analisis *sex ratio* yang bermanfaat untuk mengevaluasi keseimbangan populasi dan pengelolaan perikanan *P. flavomaculatus* khususnya di Perairan Kepulauan Spermonde serta untuk domestikasi dan budidaya.

Kata kunci: Haemulidae; ikan kaneke; meristik; morfometrik; *Plectorhinchus flavomaculatus*

ABSTRACT

Investigations into the morphometric and meristic characteristics of the kaneke fish (*Plectorhinchus flavomaculatus*, Haemulidae family) remain scarce globally, including within the South Sulawesi region. This study, conducted from October to December 2022, addresses this gap by examining 60 individuals of *P. flavomaculatus*, equally divided into 30 males and 30 females. We meticulously analyzed 16 morphometric and nine meristic characters through stepwise discriminant analysis and t-tests, aiming to uncover distinctive markers for sex identification. The results revealed a slightly higher mean standard length in females (265.27 ± 19.71 mm) compared to males (265.03 ± 27.56 mm), with males displaying greater variation. Three morphometric characters—head length, length of the second soft ray of the anal fin, and cheek height—emerged as significant sex discriminators. The discriminant function effectively categorized the sexes, though with some overlap: 22 males and 8 females among the presumed males and 20 females and 10 males among the presumed females. Notably, male *P. flavomaculatus* had a greater number of hard rays in the anal fin and more rays in the left pectoral fin compared to females. These findings contribute valuable knowledge for sex ratio analysis, supporting the balanced management of *P. flavomaculatus* fisheries, especially around the Spermonde Islands, and benefiting domestication and aquaculture efforts.

Keywords: Haemulidae; kaneke fish; meristic; morphometric; *Plectorhinchus flavomaculatus*

INTRODUCTION

The Gold-spotted Sweetlips or Lemon Sweetlips, scientifically recognized as *Plectorhinchus flavomaculatus* (Cuvier, 1830), is a coral reef species of significant economic value belonging to the Haemulidae family. Predominantly inhabiting tropical and certain subtropical marine environments in the Western Indo-Pacific region, its distribution spans from East and South Africa, across the South China Sea and Southern Japan, to as far as Brazil and Australia (Han et al. 2008; de Melo et al. 2020). Species classified under the Haemulidae family are colloquially referred to as grunts, with the family playing a crucial role in maintaining the ecological balance within coral reef ecosystems. This is achieved through their regulation of invertebrate populations and facilitation of nutrient distribution across various habitats (Araújo et al. 2018). Furthermore, they contribute significantly to underwater tourism, particularly thriving in habitats like artificial coral reefs and shipwrecks (Honorio et al. 2010).

Encompassing 17 genera and 145 species, the Haemulidae family is divided into two subfamilies: *Haemulinae* and *Plectorhincinae* (the latter also known as sweetlips) (Tavera et al. 2012). Remarkably, 13 of these species, which equates to 76.47%, are found in the Spermonde Islands located in South Sulawesi (Burhanuddin et al. 2021). In the South

China Sea, *P. flavomaculatus* has been identified as one of the six dominant species, boasting an Index of Relative Importance (IRI) exceeding 500 (Chen et al. 2007). The genus *Plectorhinchus*, hosting 31 valid species (Fricke et al. 2019), also has a presence around Australia in the Indian Ocean (Hutchins 2001) and off the Northeastern coast of Brazil (Motomura & Harazaki 2017). Specifically, in the Gulf of Oman, seven species of this genus have been identified, including *P. flavomaculatus*. Locally referred to as "Kaneke" in Makassar, South Sulawesi, this species is a popular choice for consumption, retailing at around IDR 45,000 per kilogram.

Research endeavors focusing on *P. flavomaculatus* have been limited. Existing studies have predominantly centered around its reproductive biology, with Muragi (2002) documenting a balanced 1:1 male-to-female ratio and an isometric growth pattern in populations off the coast of Kenya. Characterized by seven distinct gonad maturity stages (GMS), *P. flavomaculatus* has also been studied in the context of coral reef fish biodiversity in the South China Sea, where it was highlighted as a dominant species alongside *P. pictus* among six other prominent species (Chen et al. 2007). Han et al. (2008) further delved into the population genetic structure of this species within the South China Sea, revealing that the average dispersal distance for *P. flavomaculatus* did not surpass 300 km. Concurrently, research specific to South Sulawesi has been spearheaded by Burhanuddin et al. (2021), who, along with Mahmoodzadeh et al. (2015), referred to *P. flavomaculatus* as the Lemon Sweetlips. This species is distinguishable by its elongated, ctenoid-scaled body, graced with a unique bluish-gray hue and adorned with orange-brown spots and stripes. Its maximum total length is approximately 72 cm, with common specimens measuring around 40 cm.

Morphometric and meristic characteristics stand as quantifiable traits crucial for population identification, offering a straightforward yet cost-effective methodology. Despite necessitating the sacrifice of specimens, these characteristics occasionally surpass genetic approaches in effectiveness, particularly when discerning stocks in populations with limited genetic differentiation due to recent natural recolonization, stocking activities, or substantial gene flow (Irmawati 2016).

Morphometric and meristic traits play a pivotal role in understanding the evolutionary development of both the external and internal segments of a fish's anatomy. Morphometric analysis encompasses the utilization of specific points or landmarks, aiding in the detailed examination of the fish's body shape. This analysis spans various dimensions including total and standard lengths, head length, body width, and body height. In juxtaposition, meristic traits encompass elements such as fin rays, gill-rakers, scales, vertebrae, pyloric caeca, pterygiophores, and branchiostegal rays (Waldman 2005). In their groundbreaking work, Robitzch et al. (2021) adeptly harnessed morphometric markers to delve into the sexual dimorphism exhibited by *Schindleria*, a genus within the Gobiidae family. Similarly, Auliana et al. (2017) implemented an innovative approach, integrating both truss morphometric and meristic markers, to draw distinctions between the male and female populations of tontobi fish (*Nematalosa erebi*).

Despite existing research on the morphological distinctions within three species of the *Plectorhinchus* genus in the Persian Gulf and Gulf of Oman by Damadi et al. (2023), there remains a notable research gap

concerning *Plectorhinchus* species in South Sulawesi. Addressing this, the present study endeavors to harness both morphometric and meristic characters in distinguishing male and female *Plectorhinchus flavomaculatus*, commonly known as Kaneke fish. The anticipated findings are poised to enhance sex ratio analyses, thereby contributing to the effective management and conservation of *P. flavomaculatus* fisheries, particularly within the Spermonde Islands waters. Additionally, these insights hold potential benefits for the domestication and aquaculture sectors.

METHODOLOGY

Study Period and Location

The procurement of *Plectorhinchus flavomaculatus* specimens spanned three months, from October to December in 2022, and took place at the Poetere Makassar Fish Landing Site (TPI). The subsequent analysis of these samples was meticulously conducted within the confines of the Fisheries Biology Laboratory, nestled in the Department of Fisheries at Hasanuddin University's Faculty of Marine Science and Fisheries, located in Makassar.

Equipment and Materials

The array of equipment employed in this study comprised a coolbox, a preparation board, labeling paper, a ruler calibrated to 1 mm precision, and a digital caliper with an impressive 0.01 mm precision. Additional tools included a dissecting needle, tweezers, and a surgical knife. The central materials under investigation were the *Plectorhinchus flavomaculatus* specimens and ice for preservation purposes.

Method

Collection and Preservation of Fish Samples

The fish specimens, sourced directly from local fishermen who operate in the Spermonde waters, were subsequently transported to the Poetere Makassar TPI. The study made use of 60 individuals of *P. flavomaculatus*, evenly distributed between 30 males and 30 females, colloquially referred to as kaneke fish. Upon collection, the fish were promptly preserved with ice and identified in accordance with the criteria set out by Carpenter & Allen (1989).

Morphological Analysis of Kaneke Fish

Prior to analysis, the fish specimens underwent a thorough cleaning process and were strategically placed upon a preparation board. Each fish was meticulously labeled using the provided labeling paper, ensuring accurate and efficient species identification. Measurements of the morphometric characteristics were obtained using a precise ruler and a digital caliper. Additionally, meristic measurements were conducted using a dissecting needle and tweezers. To ascertain the sex of each specimen, a surgical knife was utilized to perform dissections.

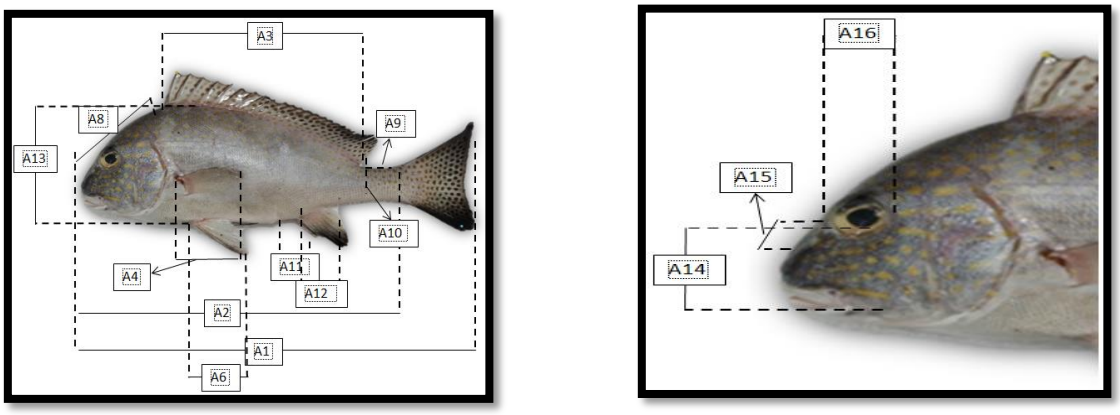

Figure 1. Morphometric characters of kaneke fish, *Plectorhinchus flavomaculatus* (Cuvier, 1830), analyzed in this study.

Table 1. Meristic characters of kaneke fish, *Plectorhinchus flavomaculatus* (Cuvier, 1830), analyzed in this study.

Code	Character	Description
A1	Total Length	Distance from the most anterior part of the head to the most posterior tip of the caudal fin
A2	Standard Length	Distance from the most anterior part of the head to the base fold of the caudal fin
A3	Dorsal Fin Base Length	Distance from the base of the first hard ray to the last soft ray of the dorsal fin, measured along the fin's base
A4	Pectoral Fin Length	Distance from the base of the fin to the longest tip of the pectoral fin
A6	Ventral Fin Length	Distance from the base of the fin to the longest tip of the ventral fin
A8	Head Length	Distance from the most anterior point of the head, at the snout, to the most posterior point of the gill cover
A9	Caudal Peduncle Length	Distance at the lowest part of the caudal peduncle
A10	Caudal Peduncle Height	Vertical distance at the lowest part of the caudal peduncle
A11	Third Hard Ray Length of Anal Fin	Distance from the base to the longest tip of the third hard ray of the anal fin
A12	Second Soft Ray Length of Anal Fin	Distance from the base to the longest tip of the second soft ray of the anal fin
A13	Maximum Body Depth	Measured at the highest ventral part between the dorsal and ventral sides
A14	Cheek Depth	Vertical distance between the eye socket and the front edge of the preoperculum
A15	Snout Length	Distance from the front edge of the snout to the anterior side of the eye socket
A16	Eye Diameter	Length of the diameter across the eye socket

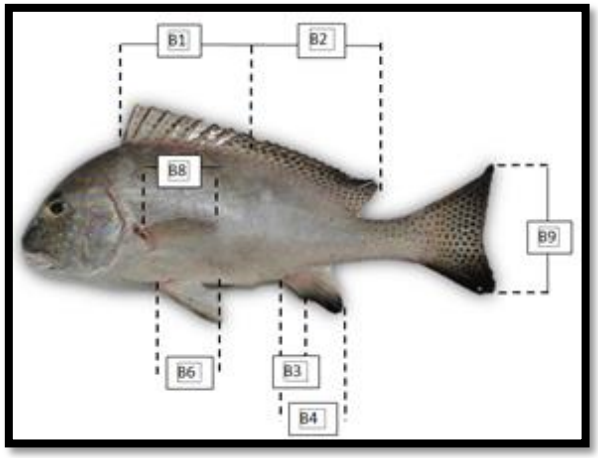

Figure 2. Detailed Analysis of Meristic Traits in *Plectorhinchus flavomaculatus* (Cuvier, 1830)

Table 2. Symbols and descriptions of meristic characters of kaneke fish, *Plectorhinchus flavomaculatus* (Cuvier, 1830), as Investigated in this Study

Code	Meristic Character	Description
B1	Dorsal Fin Spines	Count of the dorsal fin's spines
B2	Dorsal Fin Soft Rays	Count of the dorsal fin's soft rays
B3	Anal Fin Spines	Count of the anal fin's spines
B4	Anal Fin Soft Ray	Count of the anal fin's soft rays
B5	Right Pelvic Fin Rays	Count of the rays in the right pelvic fin
B6	Left Pelvic Fin Rays	Count of the rays in the left pelvic fin
B7	Right Pectoral Fin Rays	Count of the rays in the right pectoral fin
B8	Left Pectoral Fin Rays	Count of the rays in the left pectoral fin
B9	Caudal Fin Rays	Count of the rays in the caudal fin

Data Analysis

In the preliminary phase of our analysis, we engaged in data preprocessing to ensure the standardization of the raw lengths pertaining to a total of 60 kaneke fish specimens. IBM SPSS ver.22 software was employed as our analytical tool, facilitating the identification and analysis of any outlier data that had the potential to skew the mean information of our population sample. The results of this exercise were visualized using a box plot. Upon the identification of outlier data, a conscientious decision was made to exclude these from the subsequent morphometric analysis. This critical step ensured that the integrity of our analysis was maintained, as it mitigated the risk of bias stemming from uneven sample sizes. Consequently, we proceeded with 59 raw data points for further examination. The process of data standardization was meticulously conducted, adhering to a regression transformation methodology. The formula employed for this purpose was sourced from the seminal work of Elliott et al. (1995),

$$\boldsymbol{M_s = M_0\ (Ls/Lo)^b} \quad \textbf{.....(1)}$$

Explanation: M_s = standardized length data, M_o = original length data character, L_s = mean standard length of all analyzed fish samples, L_o = standard length of each specimen

sample, b = logarithm of the regression coefficient calculated from the growth equation, $M_0 = aL_0^b$. Before analysis, all measurement results were transformed using the natural logarithm.

To identify the differences in morphometric characteristics between male and female kaneke fish, discriminant analysis was conducted at the significance level $\alpha < 0.05$, employing the stepwise method (Gonzalez-martinez et al. 2021). For the analysis of meristic characteristics, t-tests were utilized at the same significance level $\alpha < 0.05$. All data analyses were executed using SPSS software.

RESULTS AND DISCUSSION

Distribution of *Plectorhinchus flavomaculatus* Lengths

Within the scope of this study, we observed a considerable variability in the standard lengths of the kaneke fish, *P. flavomaculatus*, ranging from a minimal 221.00 mm to a maximal 374.00 mm. Utilizing a boxplot to illustrate the distribution of standard lengths of P. *flavomaculatus* in the Spermonde waters of South Sulawesi, we identified an anomalous individual. This particular outlier was a male, boasting a standard length of 374 mm, while the standard lengths of the remaining 59 specimens averaged at 265.27 ± 19.71 mm for females and 265.03 ± 27.56 mm for males. It is noteworthy that the standard lengths of the male specimens demonstrated a higher degree of variability in comparison to their female counterparts (Figure 3).

Drawing from the seminal work of Smith & McKay (1986), they reported that the maximal total length for male *P. flavomaculatus* could reach up to 600 mm. Furthermore, the comprehensive study conducted by Damadi et al. (2020) revealed that species under the *Plectorhinchus* genus in the Persian Gulf and Oman Sea diverge into two phylogenetic clades, with *P. flavomaculatus* aligning in a clade alongside *P. makranensis*. The standard lengths of *P. makranensis* in the Oman Sea were documented to vary between 246.5 mm and 345.6 mm. This comparative analysis indicates that, on average, the *Plectorhinchus* genus within the Makassar Strait tends to manifest larger dimensions in contrast to those located in the Oman Sea.

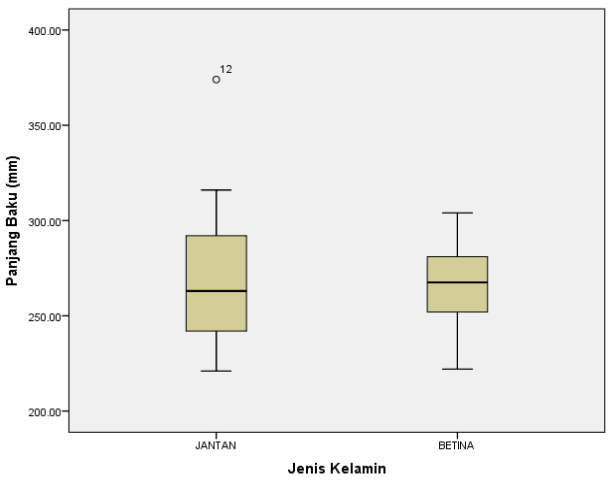

Figure 3. Box-plot of the distribution of standard-length sizes of kaneke fish, *Plectorhinchus flavomaculatus* (Cuvier, 1830), landed at the Fish Landing Site (TPI) Poetere Makassar in October - December 2022.

The Test of Equality of Group Means, as outlined in Table 3, reveals a critical observation from the 15 morphometric characteristics of the kaneke fish, *Plectorhinchus flavomaculatus*, evaluated using the discriminant analysis method. Specifically, the characteristic "length of the second weak ray of the anal fin (A12)" stands out with a significance value of 0.034, falling below the threshold of 0.05. This finding underscores the challenge in distinguishing between male and female specimens of this species based solely on their morphometric traits, as the majority of the characteristics do not exhibit significant sexual dimorphism. Delving deeper, the application of the stepwise discriminant analysis method culminated in the development of a discriminant function. This function uniquely combines three morphometric features: "head length," "length of the second weak ray of the anal fin," and "cheek height." These combined traits hold the potential to effectively segregate male and female P. *flavomaculatus* within the Spermonde Waters. The discriminant function derived from this analysis stands out as a practical solution for sex identification, offering a balance of time-efficiency and cost-effectiveness, while also upholding environmental responsibility. Unlike conventional methods that necessitate invasive procedures such as surgery or gonad analysis – either morphologically or through techniques like acetocarmine staining and histology, which unfortunately result in the sacrifice of the specimens – this non-invasive approach outlined in Table 4 presents a viable alternative, contributing positively to sustainable research practices.

Tabel 1. Results of Tests of Equality of Group Mean

Morphometric Characters	Male		Female		Sig.	Wilks' Lambda
	Range	Mean	Range	Mean		
A1	228,00-374,00	318,87 ± 0,18	249,00-374,00	317,53 ± 0,14	0,916	1,000
A3	113,76-243,25	169,76 ± 0,11	125,22-212,00	170,18 ± 0.10	0,825	0,999
A4	38,66-77,00	52,99 ± 0,03	43,53-70,00	54,42 ± 0,52	0,671	0,997
A5	39,75-77,20	53,1 ± 0,03	43,76-70,50	54,6 ± 0,06	0,380	0,987
A6	42,93-80,00	54,19 ± 0,03	41,00-73,00	55,54 ± 0,03	0,452	0,990
A7	41,44-80,00	54, 01 ± 0,31	41,00-73,00	55,64 ± 0,03	0,385	0,987
A8	33,14-75,00	51 ± 0,31	37,59-64,00	50,55 ± 0,03	0,979	1,000
A9	21,88-51,00	36,11 ± 0,03	24,00-47,00	35,11 ± 0,03	0,634	0,996
A10	19,17-78,00	28,48 ± 0,02	19,80-43,00	27,69 ± 0,02	0,870	1,000
A11	19,61-69,00	41,07 ± 0,05	22,60-61,00	41,37 ± 0,05	0,786	0,999
A12	30,89-69,10	44,69 ± 0,03	30,67-61,00	44,95 ± 0,03	0,034	0,925
A13	72,18-151,00	101, 72 ± 0, 06	71,95-126,00	101, 95 ± 0,06	0,829	0,999
A14	20,96-45,00	33,11 ± 0,02	24,40-50,00	35,39 ± 0,02	0,089	0,951
A15	6,86-18,00	11,1 ± 0,01	5,96-17,00	11,17 ± 0,01	0,805	0,999
A16	12,00-23,00	19,09 ± 0,01	14,20-23,00	19,12 ± 0,01	0,890	1,000

Tabel 2. Coefficients for Canonical Discriminant Functions

Discriminator	Canonical Discriminant
	1
A8 = Head Length	42,695
A12 = Second Soft Ray Length of Anal Fin	0,269
A14 = Cheek Height	-75,463
Constant	1,371

The discernment between male and female kaneke fish, *P. flavomaculatus*, in South Sulawesi is adeptly facilitated through the discriminant function **Y** = 1,371 + 42,695 **A8** + 0,269 **A12** - 75,463 **A14**. This function integrates three pivotal characteristics that are not entangled by multicollinearity issues, ensuring its robust applicability. However, it is noteworthy that the correlation coefficient between head length (A8) and cheek height (A14) is slightly above the threshold, registering just over 0.8, (Table 5). The utility of this discriminant function is straightforward: a value of Y < 0 categorizes the specimen as female, whereas a value > 0 classifies it as male. The eigenvalue associated with this discriminant function, as presented in Table 6, is illuminating—it accounts for 100% of the variance observed, correlated canonically at a magnitude of 0.466. This correlation underscores the function's efficacy in distinguishing between sexes.

When applied, this discriminant function demonstrated its practicality. Out of 30 individuals preliminarily identified as male, it accurately categorized 22 as males and misclassified 8 as females. On the other hand, of the 30 specimens initially presumed to be female, it correctly identified 20, albeit misclassifying 10 as males (Table 7).

Tabel 3. Results of Pooled Within-Groups Matrices

	A1	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16
	1,000														
A3	0,857	1,000													
A4	0,082	0,317	1,000												
A5	0,854	0,857	0,101	1,000											
A6	0,719	0,666	-0,021	0,871	1,000										
A7	0,711	0,670	-0,017	0,880	0,985	1,000									
A8	0,844	0,813	0,063	0,873	0,766	0,763	1,000								
A9	0,747	0,734	0,083	0,644	0,442	0,431	0,756	1,000							
A10	0,713	0,726	-0,081	0,787	0,720	0,726	0,751	0,595	1,000						
A11	0,766	0,868	0,052	0,818	0,688	0,693	0,802	0,694	0,780	1,000					
A12	0,248	0,240	-0,069	0,130	0,197	0,204	0,223	0,142	0,338	0,356	1,000				
A13	0,898	0,937	0,132	0,879	0,688	0,686	0,883	0,797	0,761	0,884	0,212	1,000			
A14	0,792	0,851	0,030	0,864	0,757	0,755	0,862	0,739	0,729	0,842	0,186	0,863	1,000		
A15	0,789	0,825	0,064	0,782	0,645	0,655	0,741	0,696	0,745	0,846	0,245	0,845	0,710	1,000	
A16	0,754	0,689	0,047	0,741	0,706	0,689	0,715	0,513	0,492	0,603	0,052	0,746	0,643	0,588	1,000

Tabel 6. Eigenvalue and Variance Distribution of the Discriminant Function

Eigenvalues				
Function	*Eigenvalue*	*% of Variance*	*Cumulative %*	*Canonical Correlation*
1	.278[a]	100,0	100,0	0,466

Tabel 7. Classification Accuracy of Gold-Spotted Sweetlips (*Plectorhinchus flavomaculatus* (Cuvier, 1830)) Sex Prediction via Discriminant Function Analysis

Sample Parameters		Prediction		Total
		Male	Female	
Count	Male	22	8	30
	Female	10	20	30
Percentage	Male	73,3	26,7	100
	Female	33,3	66,7	100

Upon scrutinizing the independent t-test outcomes concerning the meristic features of both male and female *Plectorhinchus flavomaculatus* (Cuvier, 1830), it is apparent that among the nine evaluated meristic characteristics, a mere two exhibit statistically significant disparities. Specifically, these characteristics are the quantity of spines present in the anal fin (B3), and the count of spines in the left pelvic fin (B6), as delineated in Table 8.

Tabel 4. Independent t-tests between meristic characters of male and female Lemon sweetlips, *Plectorhinchus flavomaculatus* (Cuvier, 1830) landed at TPI Poetere Makassar.

Meristic Character	Male		Female		Sig.
	Range	Mean	Range	Mean	
B1	8-10	9,97	9-10	9,97	0,610
B2	20-26	22,67	21-26	23,23	0,235
B3	2-3	2,87	2-3	2,73	0,010
B4	6-9	7,3	6-8	7,33	0,562
B5	5-6	6,0	5-7	5,9	0,083
B6	5-6	5,87	5-6	5,77	0,047
B7	14-18	15,67	12-18	16,4	0,367
B8	15-18	15,47	14-17	16,4	0,939
B9	15-19	17,3	15-19	17,73	0,394

Conclusion

Within the confines of this inquiry, we have successfully identified three morphometric traits — head length, Second Soft Ray Length of Anal Fin, and cheek height — that collectively contribute to a discriminant function, enabling a clear distinction between the male and female Lemon sweetlips, *Plectorhinchus flavomaculatus* (Cuvier, 1830), as observed at TPI Poetere Makassar. In addition to these morphometric traits, our study also brought to light two meristic characteristics, namely the spines' count on both the anal fin and the left pelvic fin, that further aid in differentiating between the two sexes. The derived discriminant function stands as a testament to our progress, proving itself as an invaluable tool in the nuanced surveying of *P. flavomaculatus* resources, particularly in the sphere of fisheries management dedicated to this species.

Recommendations

In our quest for a more profound understanding and a broader data spectrum regarding the Lemon sweetlips, *Plectorhinchus flavomaculatus*, residing in the waters surrounding the Spermonde Islands, we advocate for the initiation of subsequent research endeavors. These should prominently feature the utilization of truss morphometric methods and DNA barcoding, aiming to unearth comparative data while simultaneously delving into the exploration of haplotype diversity within this intriguing species. Through this methodological augmentation, we aspire to enrich the existing body of knowledge, fostering a more comprehensive and nuanced grasp of the *P. flavomaculatus* population dynamics and genetic diversity.

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